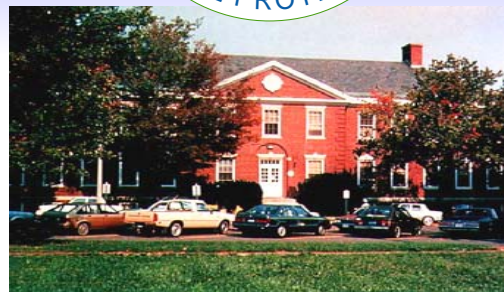


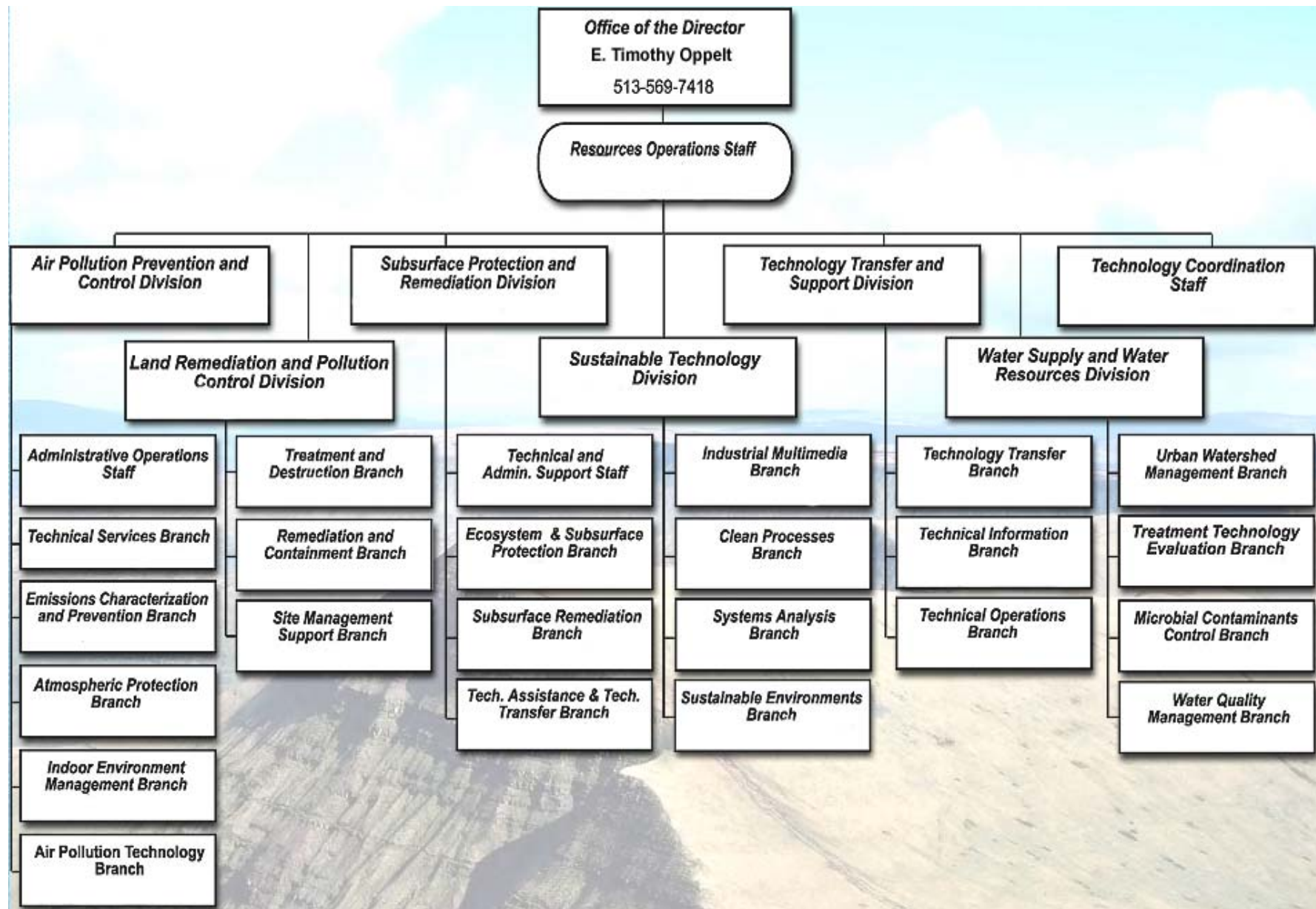
U.S. Environmental Protection Agency

National Risk Management Research Laboratory

Virtual Tour



National Risk Management Research Laboratory (NRMRL) Organization Chart





NRMRL Mission Statement

As part of the U.S. Environmental Protection Agency's Office of Research and Development, the National Risk Management Research Laboratory (NRMRL) conducts research into ways to prevent and reduce risks from pollution that threaten human health and the environment. The laboratory investigates methods for: 1) protection of water quality in public water systems; 2) air pollution control; 3) pollution prevention; 4) sustainability of resources for future generations; 5) remediation of contaminated sites, sediments and groundwater; 6) management and restoration of watersheds; 7) verification of innovative technologies; and 8) technology transfer and technical support.

NRMRL Headquarters


Andrew W. Breidenbach Environmental Research Center, Cincinnati, Ohio



The Andrew W. Breidenbach Environmental Research Center is the headquarters location for the National Risk Management Research Laboratory (NRMRL), and one of two major EPA research centers in the nation, housing research laboratories, training facilities, and administrative offices. The ten-story structure located at 26 W. Martin Luther King Drive in Cincinnati, Ohio, is named for its first director, Dr. Andrew W. Breidenbach. The building, completed in 1975 at a cost of \$28 million, was dedicated by President Gerald Ford.

Air Pollution Prevention & Control Facility

Research Triangle Park, North Carolina



The mission of the Air Pollution Prevention and Control Facility, located in Research Triangle Park, North Carolina, is to research, develop and demonstrate air pollution prevention and control technologies, and characterize emissions for a variety of sources including power plants, manufacturing and processing industries, incinerators, and indoor environments. Research also includes verification of the performance of innovative technologies.

Center Hill Facility


Cincinnati, Ohio



This facility researches, develops, and demonstrates the treatment, immobilization, or containment of contaminants in soils and sediment that relate to environmental exposure.

Full Containment Facility

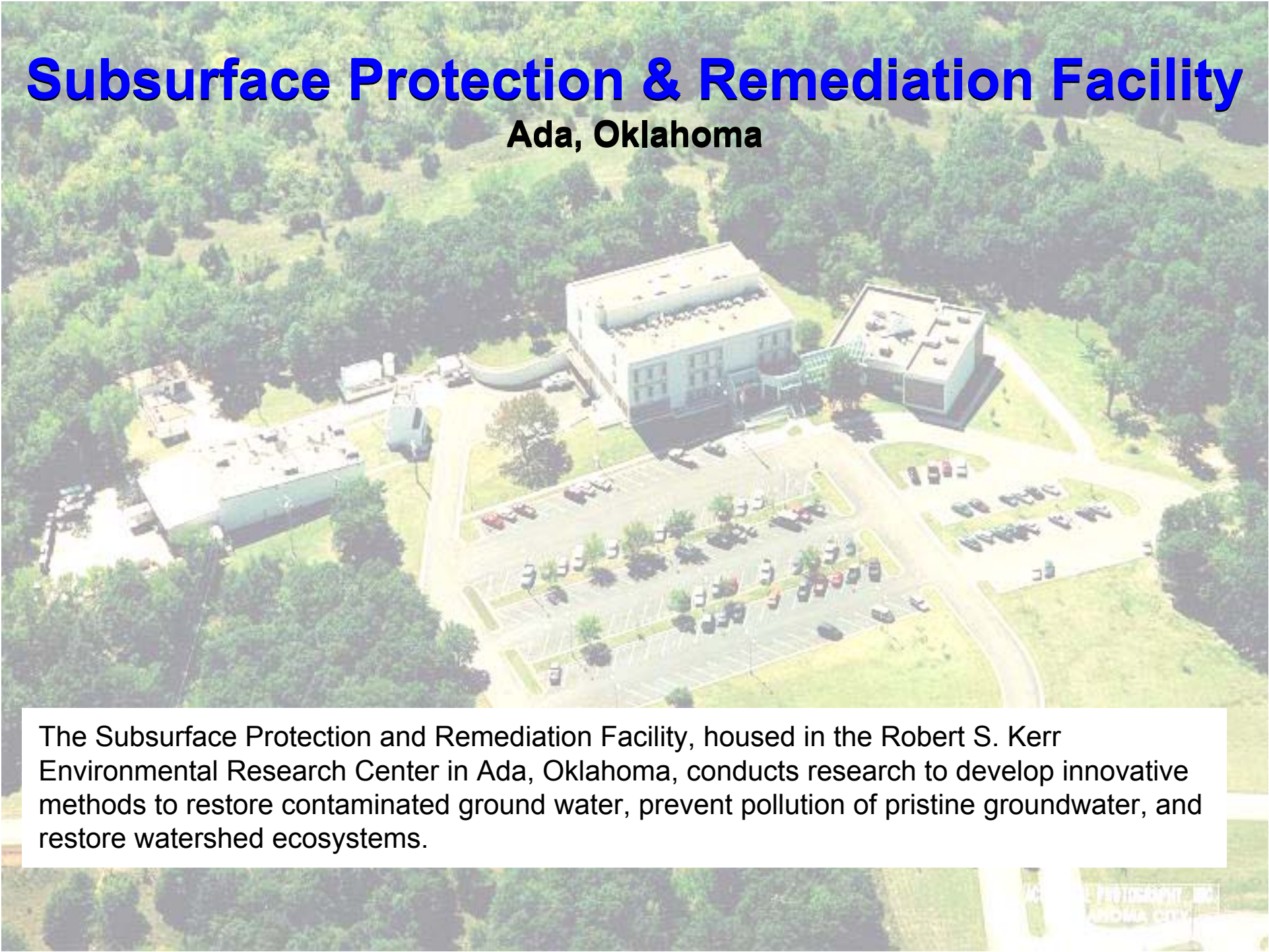
Cincinnati, Ohio



The Full Containment Facility, located near the Andrew W. Breidenbach Environmental Research Center, houses the laboratory where research is conducted in the area of Green Chemistry and Metals Recovery.

Subsurface Protection & Remediation Facility

Ada, Oklahoma



The Subsurface Protection and Remediation Facility, housed in the Robert S. Kerr Environmental Research Center in Ada, Oklahoma, conducts research to develop innovative methods to restore contaminated ground water, prevent pollution of pristine groundwater, and restore watershed ecosystems.

Test and Evaluation Facility

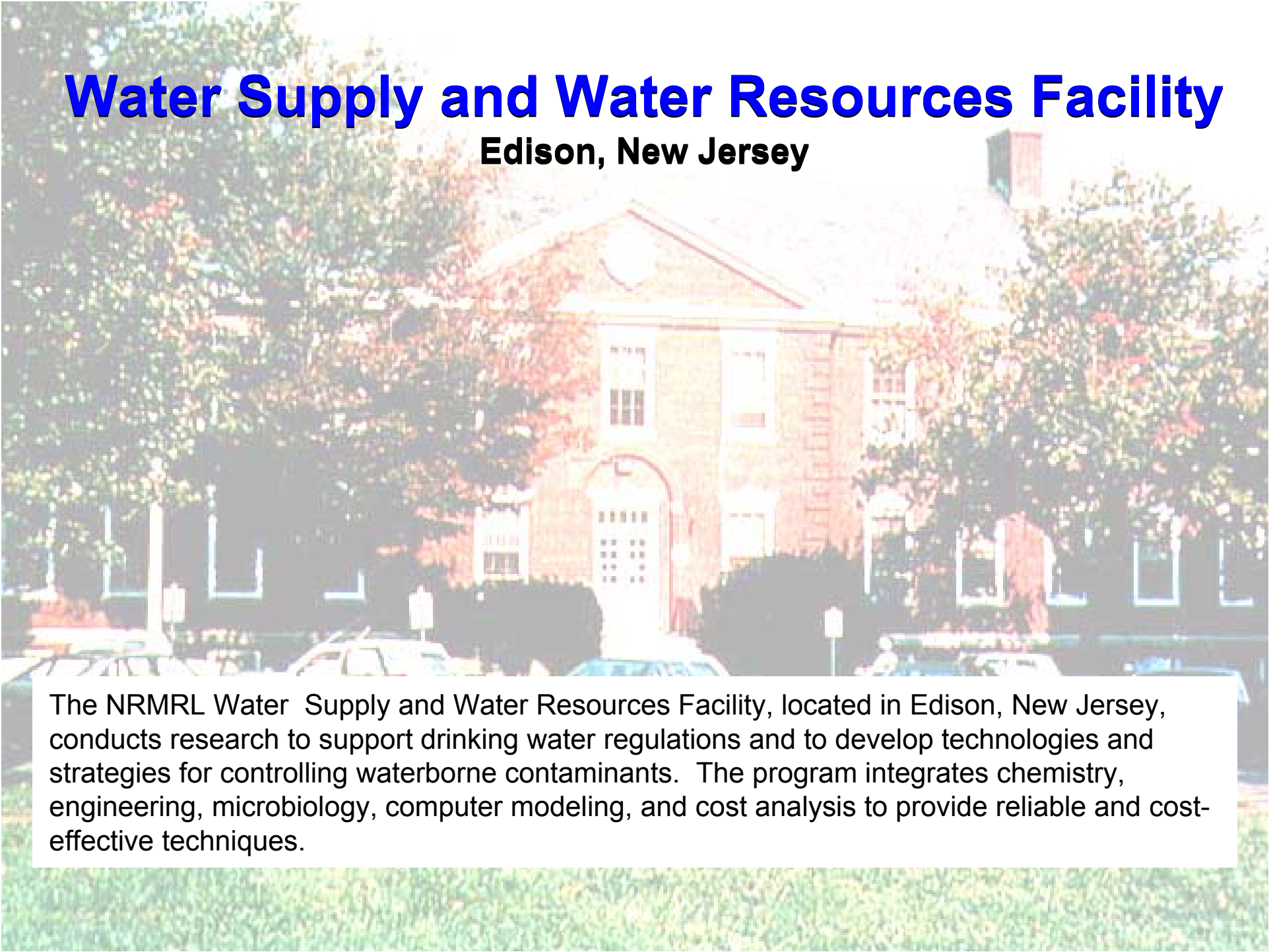
Cincinnati, Ohio



The Test and Evaluation Facility conducts experimental research on new treatment technologies of water and hazardous waste for many NRMRL Divisions.

Water Supply and Water Resources Facility

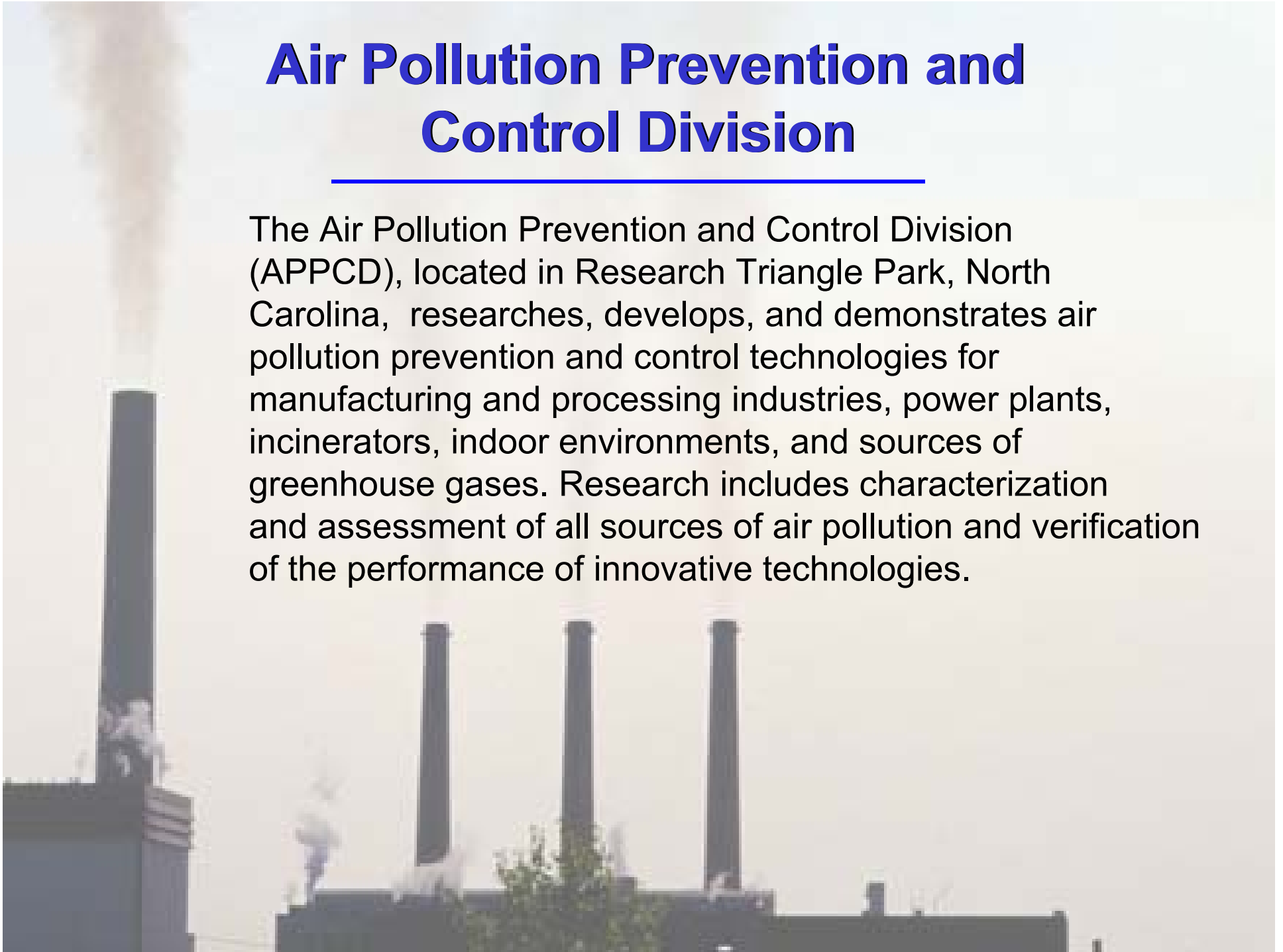
Edison, New Jersey



The NRMRL Water Supply and Water Resources Facility, located in Edison, New Jersey, conducts research to support drinking water regulations and to develop technologies and strategies for controlling waterborne contaminants. The program integrates chemistry, engineering, microbiology, computer modeling, and cost analysis to provide reliable and cost-effective techniques.

Air Pollution Prevention and Control Division

The Air Pollution Prevention and Control Division (APPCD), located in Research Triangle Park, North Carolina, researches, develops, and demonstrates air pollution prevention and control technologies for manufacturing and processing industries, power plants, incinerators, indoor environments, and sources of greenhouse gases. Research includes characterization and assessment of all sources of air pollution and verification of the performance of innovative technologies.



New Highbay Facility



APPCD's highbay building at Research Triangle Park, North Carolina, is a 30,000-square-foot facility designed to house large-scale test equipment. It includes 21 bays and 11 analytical laboratories. Research focuses on emissions from a variety of fuels (coal, oil, waste) in several combustion system (incinerator, boiler) combinations. Other testing includes the environmental impacts of emissions from diesel truck engines, and spray-booth emissions of paints and other coatings

Indoor Air Test House



This 3-bedroom indoor air test house is equipped with a wide range of air monitoring instruments used to characterize indoor air quality under realistic conditions. Researchers have tested kerosene heaters, newly dry-cleaned clothes, moth balls, newly cleaned air ducts, and other typical consumer products to evaluate impacts on indoor air quality.

On-Road Test Vehicle



This on-road test vehicle determines the amounts of ammonia generated by automobile catalytic converters in order to predict the amount of fine particles of ammonium nitrate formed in the atmosphere that pose a hazard to human health.

Monitoring Barn Ammonia Emissions



Here ammonia concentrations exhausted from a swine barn containing thousands of animals are sampled by a Fourier transform infrared system. The amount that an infrared, invisible, beam of light wave energy is absorbed at a specific wavelength is used to determine contaminant emissions.

Renewable Energy Plant



This renewable energy project - the Cratech project plant - generates electricity from plant material such as tree limbs, grass, paper and sawdust. The technology converts plant 'biomass' into fuel gas similar to natural gas at the rate of 1000 kilowatts of electricity every hour—enough to supply about 500 suburban residences. The gas is cleaned, then burned in an engine similar to a jet engine, and connected to a generator to produce electricity.

Large Environmental Chamber



The large environmental chamber is used to test air emissions of consumer products commonly found indoors such as carpets, paints, photocopiers, and air fresheners. Researchers also use the chamber to evaluate the effectiveness of air cleaning devices.

Land Remediation and Pollution Control Division

The Land Remediation and Pollution Control Division (LRPCD) conducts research to explore innovative solutions to current and future land pollution problems. LRPCD programs include:

- Field evaluation and demonstration of innovative technologies
- Verification of externally acquired data
- Development and testing of management techniques and disposal practices for municipal waste sites
- Technical assistance for both Superfund and non-Superfund contaminants

From research through field evaluation, Division activities combine in-house work, extramural activities, and federal/state partnerships.

Petroleum Degradader Research



Researchers isolate cultures to identify petroleum degraders—microorganisms that assist in the biodegradation (cleanup) of hydrocarbons in soils. Microbial identification systems in the laboratory can identify a wide variety of metabolic patterns because of the unique “fingerprint” produced by each microbe.

Isotope Ratio Mass Spectrometry Lab



Specialized instrumentation determines the ratios of stable isotopes of carbon, hydrogen and nitrogen in environmental samples. By analyzing the differences in these ratios, it is possible to study hydrocarbon biodegradation, nutrient flow, and interaction with groundwater and surface water.

Laboratory Research



This electrochemical degradation apparatus is used to degrade chlorinated solvents



Flexible wall soil permeameters measure the performance of landfill liners to meet Resource Conservation and Recovery Act requirements.

Laboratory Research



This gas chromatograph and mass spectrometer system is used to analyze volatile organic compounds that contribute to air and water pollution.



The atomic absorption spectrometer is used to measure metals in solution.

Laboratory Research



An X-Ray diffraction instrument identifies and quantifies minerals in soil and sediments.



Inductively coupled argon plasma instrumentation measures multiple metals in solutions simultaneously.

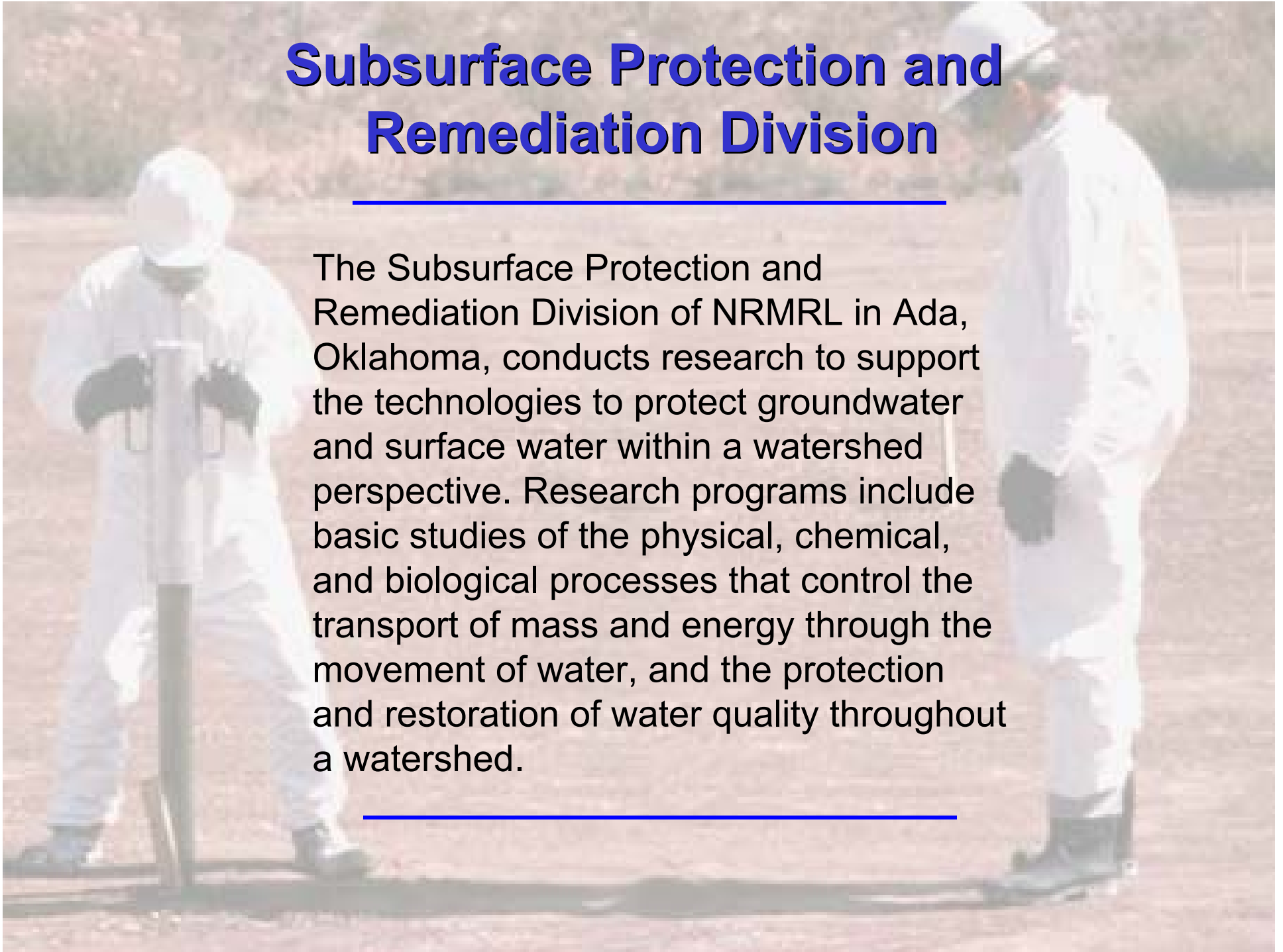
Microbiological Research



Microbiological and stable isotope techniques are used to evaluate new and better cleanup methods of toxic substances, as in the bioremediation of PCBs.

Subsurface Protection and Remediation Division

The Subsurface Protection and Remediation Division of NRMRL in Ada, Oklahoma, conducts research to support the technologies to protect groundwater and surface water within a watershed perspective. Research programs include basic studies of the physical, chemical, and biological processes that control the transport of mass and energy through the movement of water, and the protection and restoration of water quality throughout a watershed.



Groundwater Sampling



A mobile lab gathers groundwater samples to assess the impact on adjacent groundwater of a large concentrated animal feed operation on the Oklahoma panhandle (background).

Solid-Phase Extraction



Technicians perform solid-phase extraction of groundwater samples from the feedlot operation site (shown left) for analysis of trace levels of antibiotics in the groundwater.

Nutrient Cycling



Floating “limno-corrals” provide a contained environment for nutrient recycling studies, while maintaining values and variability of the natural pond environment.

MTBE Sampling



As part of a study of stressors on a typical multi-use reservoir system, researchers at a marina on Lake Texoma on the Oklahoma-Texas border sample water for MTBE. MTBE (methyl *tert*-butyl) is a fuel additive used to reduce carbon monoxide emissions.

Scintillation Counters



A scintillation counter tracks contaminant movement using radioactive tracers.

Atomic Adsorption Spectrometer



An atomic adsorption spectrometer performs analysis of arsenic in water samples. Other equipment analyzes trace quantities of toxic metals in soils, groundwater and plants.

Anaerobic Glove Boxes



Anaerobic (oxygen-free) glove boxes help maintain an environment similar to that found in the soil subsurface. They are used extensively to study the behavior of metals in subsurface environments.

GC/MS Instruments



Specialized instruments in the gas chromatography/mass spectrometry lab are used to analyze volatile compounds, as part of the remediation of contaminated groundwater and the restoration of ecosystems.

Sustainable Technology Division

The Sustainable Technology Division conducts research to advance the scientific development and application of technologies and methods for prevention, removal and control of environmental risks to human health.

Pervaporation

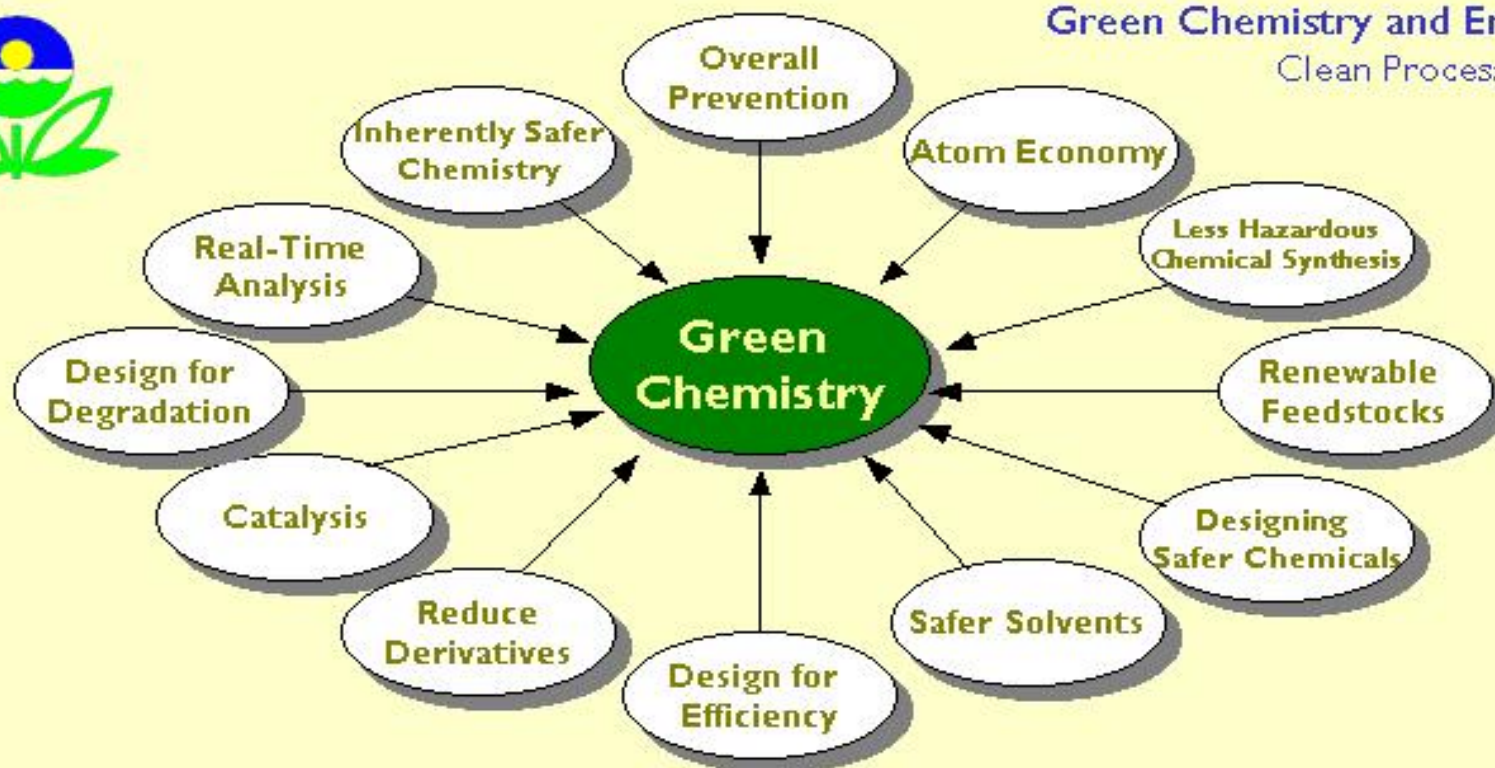


Pervaporation is a membrane-based technology for the remediation of contaminated soil or water and the recycling of the remediation fluids. The STD pilot unit above successfully removed perchloroethylene from a remediation fluid at Marine Corps Base Camp Lejeune, North Carolina.

Green Chemistry

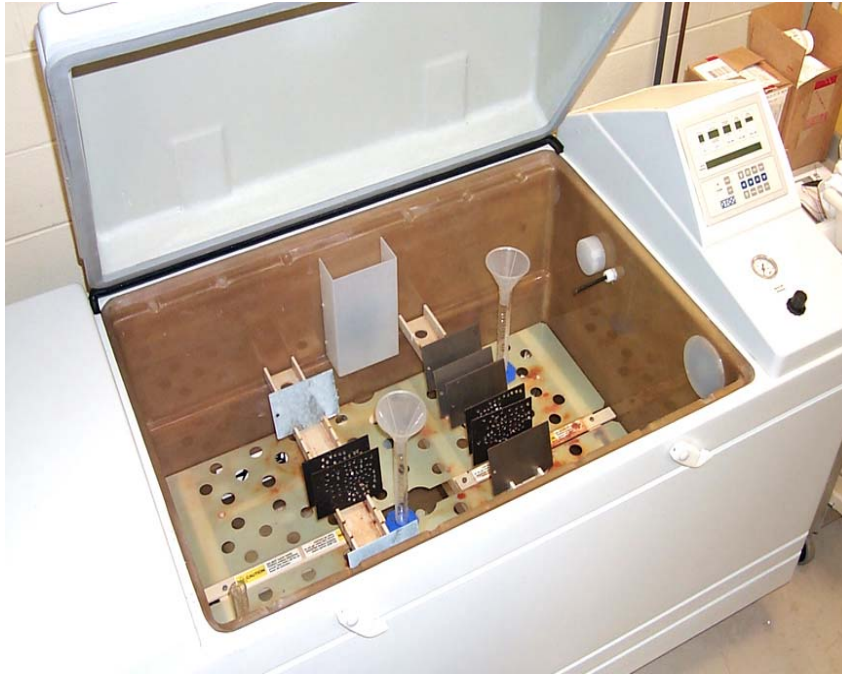


Green Chemistry and Engineering
Clean Processes Branch



The Green Chemistry Program researches pollution prevention alternatives for the chemical manufacturing industry by developing chemical reactions or processes that incorporate the principles shown in this model. The model depicts approaches that can potentially lead to a safer, more cost-effective chemical reaction or process. One example is the development of alternative solvents such as water, carbon dioxide or ionic liquids in place of toxic substances. Alternative energy sources for chemical synthesis are also being researched, such as microwave or solar energy.

Picklex® Process



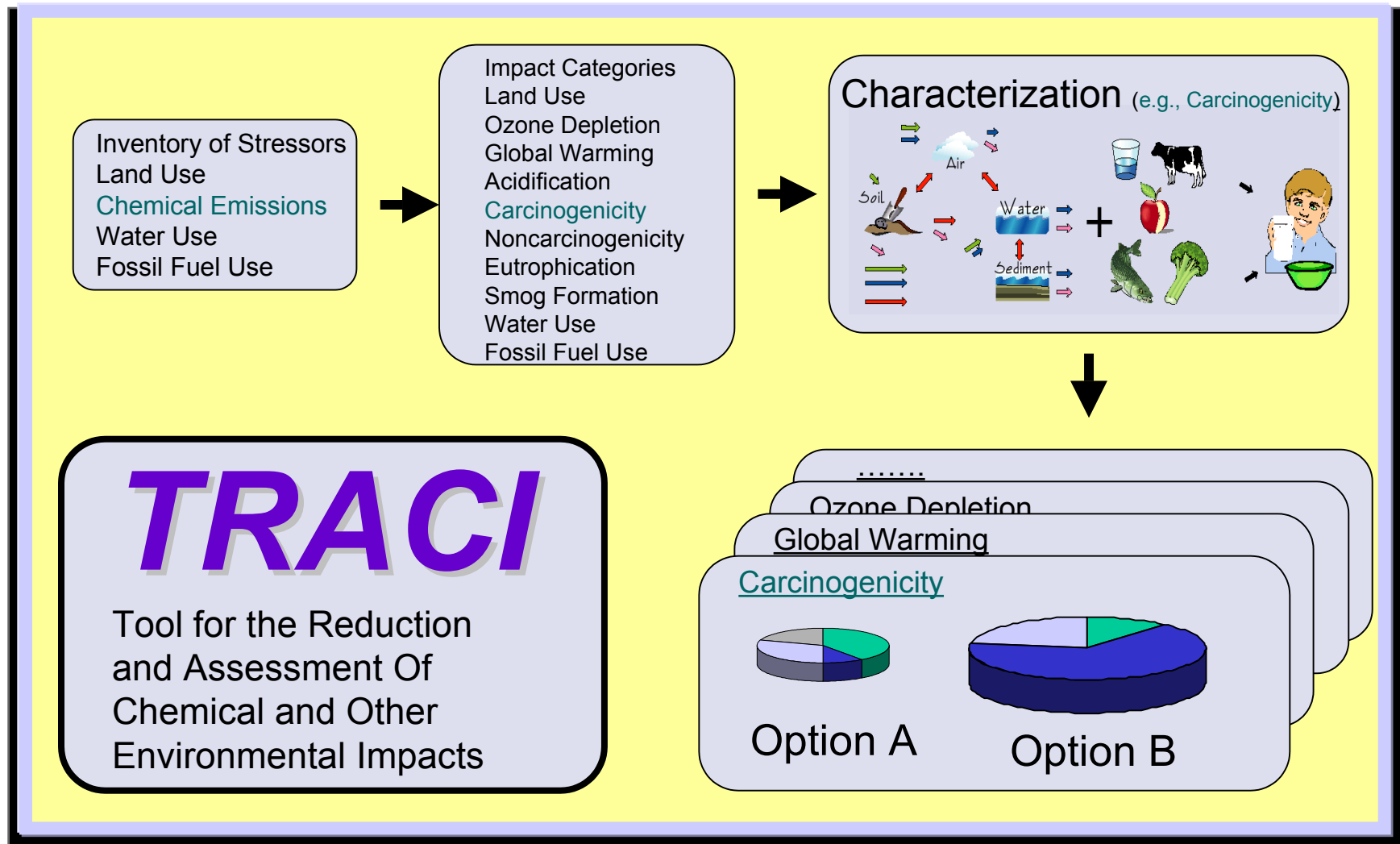
The Picklex® process is a non-polluting pretreatment coat that replaces conventional coatings (such as chromate used for aluminum products or zinc and iron phosphating used for steel products). The Picklex® process eliminates or significantly reduces pollution while maintaining the same high-quality finish and wear-resistance of conventional coatings.

Paris II



PARIS - Program for Assisting the Replacement of Industrial Solvents - is a software tool that identifies compounds that perform better than conventional solvents, yet are less hazardous to the environment.

TRACI



TRACI - Tool for the Reduction and Assessment of Chemical and Other Impacts - is an impact assessment tool that can assist decision-makers in the use of pollution prevention programs or other environmental sustainability activities.

Green Chemistry at Work



Researchers use an environmentally benign catalyst (titanium dioxide) and ultraviolet light to convert saturated hydrocarbons into partial oxygenates - an innovative technology for oxidizing organic chemicals. The goal is to develop safer production processes for the synthesis of commercially important chemicals.

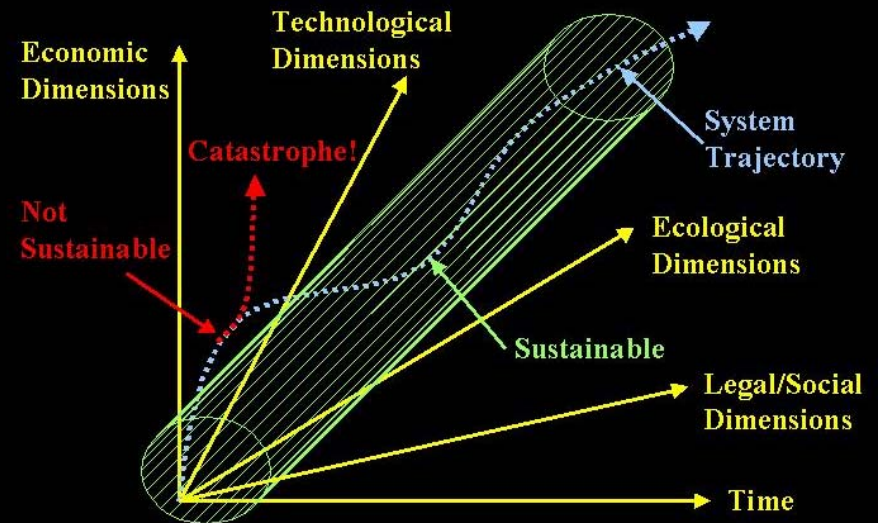
A Model of Environmental Sustainability

Sustainable Environments Branch

Mission

- To construct a strategy for sustainable Environmental Systems Management using ...
- economics approaches, water resource and land use planning, physical and ecological theory, law, and technological methods and knowledge ...
- implemented through computer based tools, field data and human experience to reduce risks to human health and the ecology.

Sustainable Systems Path

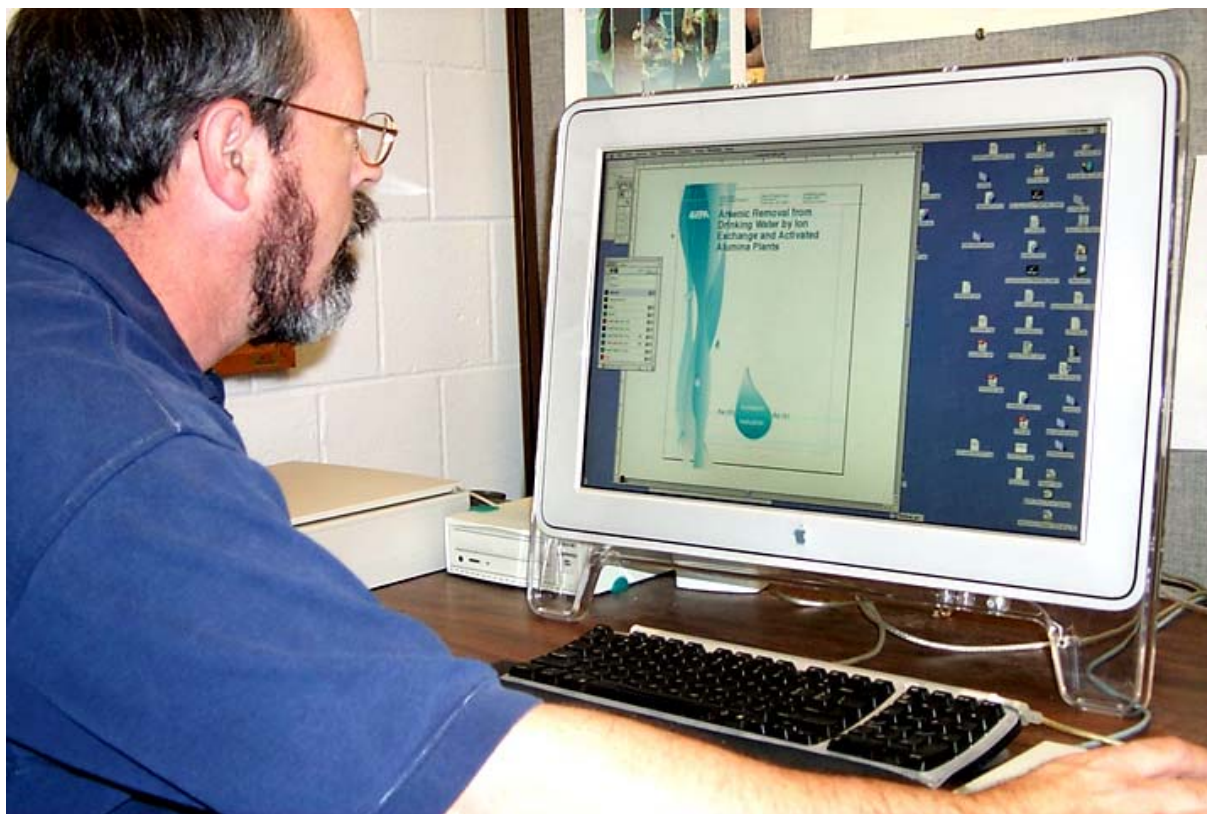


A strategy for tracking a complex social system with ecological, economic, social, and legal dimensions through time. It demonstrates a way of systematically managing a sustainable environment through the use of computer-based tools and human experience.

Technology Transfer and Support Division

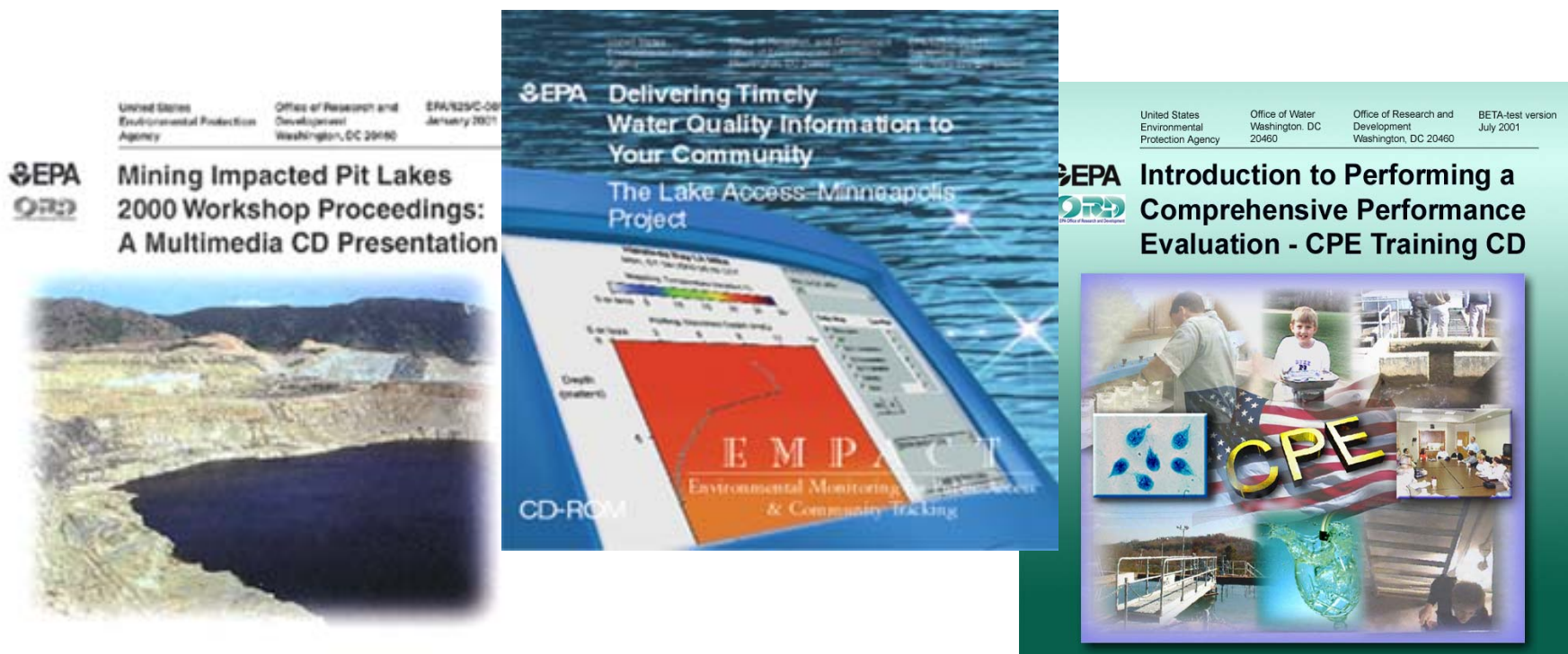
The Technology Transfer and Support Division supports information development and dissemination programs to assist internal and external audiences in applying the knowledge and technological tools generated by ORD's research activities. It also provides critical support services to NRMRL researchers, including quality assurance, environmental health and safety, and research infrastructure and technical support, including management of the Test and Evaluation Facility.

Graphics Design



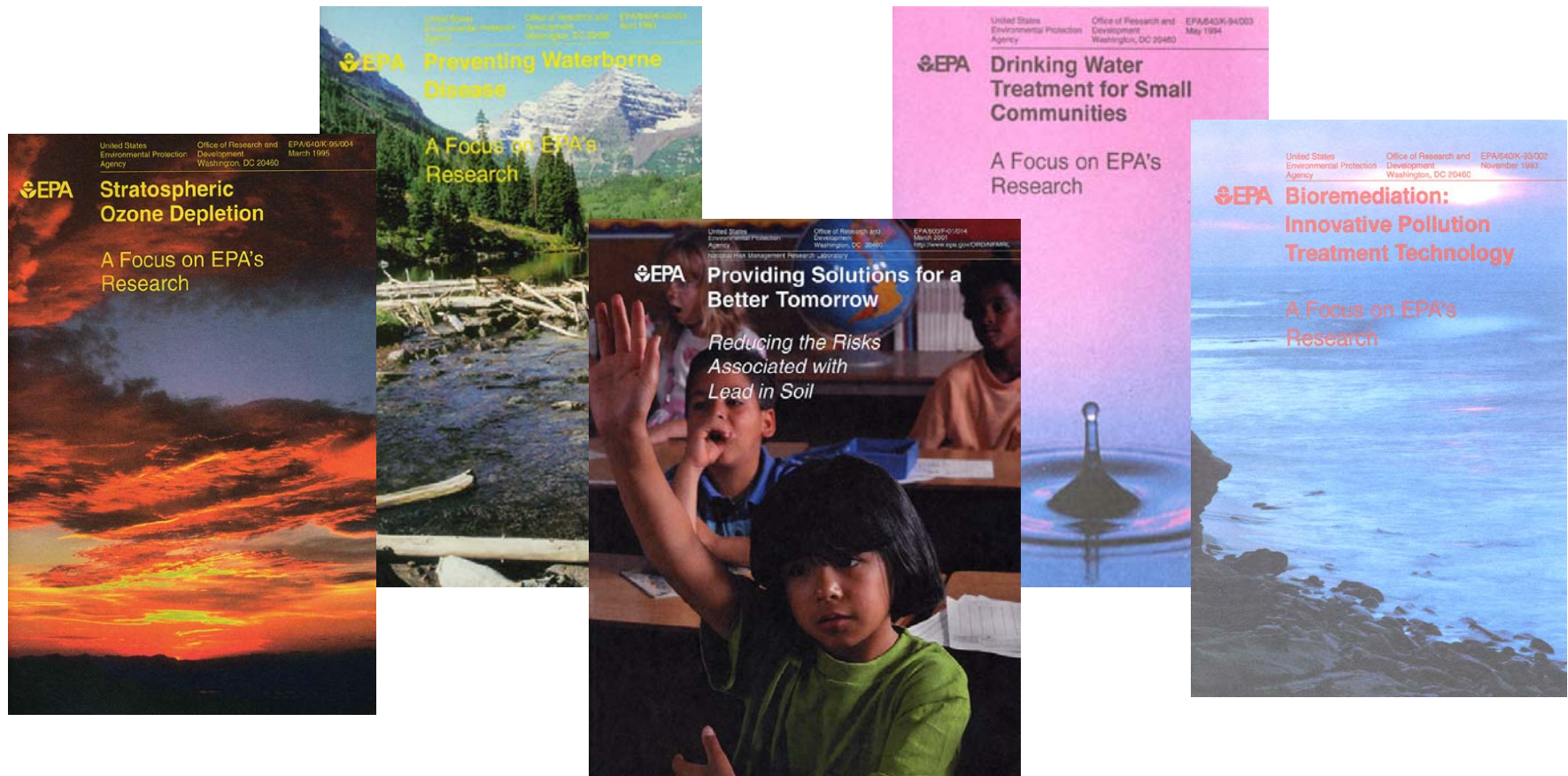
The graphics production unit creates design layouts for ORD documents such as technical reports, manuals and conference proceedings. Display materials and graphics for presentations are also produced in this facility.

Multimedia Product Development



These CD covers show recent multimedia products written and created in-house as training tools and workshop proceedings. TTSD also produces DVD and website products that incorporate peer-reviewed content with state-of-the-art digital video and audio, and 3-D animated components to communicate NRMRL's research activities.

Public Information Products



Attractive graphics and easy-to-understand language help readers grasp complex environmental issues. Designed and written in-house, these brochures advance public understanding of the goals and challenges of environmental risk management.

Technical Exhibits



Technical exhibits at major national and international conferences disseminate EPA materials that inform and instruct clients. Our clients represent national, international, state, tribal and local governments, as well as industry, academia and environmental groups. An estimated 100,000 people visited TTSD exhibits during the last fiscal year.

Test and Evaluation Facility



The Test and Evaluation Facility in Cincinnati provides research infrastructure, technical support and staff for experimental treatability studies. The facility is also made available to other public- and private-sector researchers through cooperative research and development agreements.

Phytotechnologies



Phytotechnologies are a set of technologies that use plants to clean up contaminated soil or water. This project in the Test and Evaluation Facility is researching the use of grasses and alfalfa in the removal of organic pollutants from soil.

Water Supply and Water Resources Division

The Water Supply and Resource Division (WSWRD) conducts research to help prepare the primary and secondary regulations for drinking water and to develop technologies and strategies for controlling waterborne contaminants. The program integrates chemistry, engineering, microbiology, computer modeling and cost analysis to provide, reliable and cost-effective techniques. WSWRD programs include research on:

- Urban and non-urban stormwater runoff
 - Combined and sanitary sewer overflows
 - Underground and aboveground storage tanks, and oil spills
 - Contaminated sediments
 - Treatment, distribution and support services for safe drinking water
 - Watershed hydrology modeling
 - Constructed wetlands
-

Drinking Water Distribution Systems



The Simulated Distribution System at EPA's Test and Evaluation Facility in Cincinnati helps researchers understand the dynamics that influence drinking water quality within water distribution systems in the U.S. and other countries.

Copper Corrosion Experimental System



This experimental system is used to study chemical factors affecting the input of copper, lead, and other metals into drinking water. Data are used to develop guidance for treatment and regulatory compliance.

Water Supply Research



An ozone reactor is used for studying ozonation treatment of drinking water.



An online data acquisition system used to diagnoses the performance of drinking water filters in the removal of turbidity (cloudiness) and particles.

Water Supply Research (*cont.*)

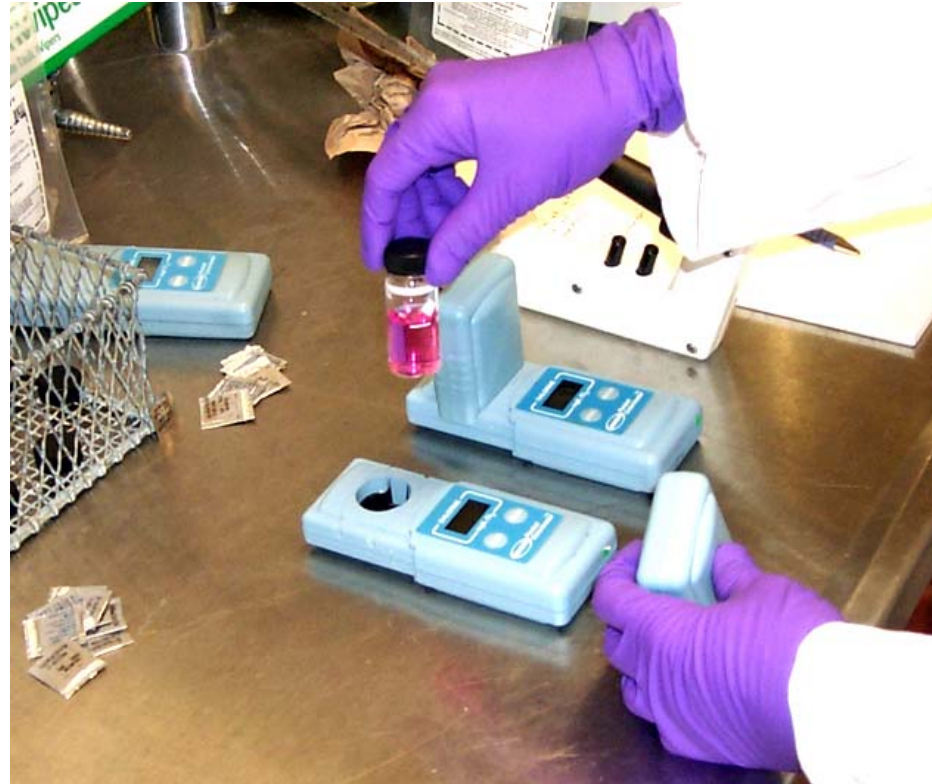


The pilot-scale filtration system simulates the drinking water filters used in most large city systems.



The advanced oxidation process equipment shown here employs ozone and ultraviolet light to remove MTBE from drinking water.

Microbial Disinfection Research

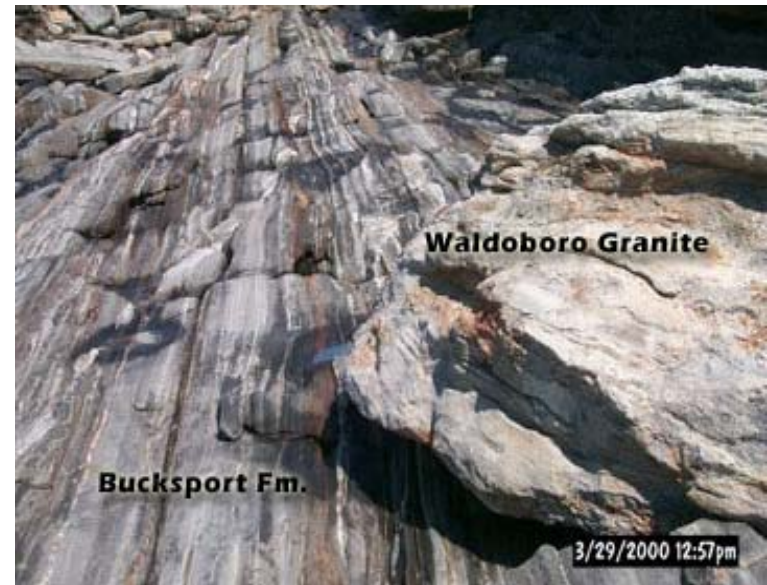


This experimentation determines the effectiveness of chlorine for inactivating viruses suspended in drinking water.

Isotope Hydrology

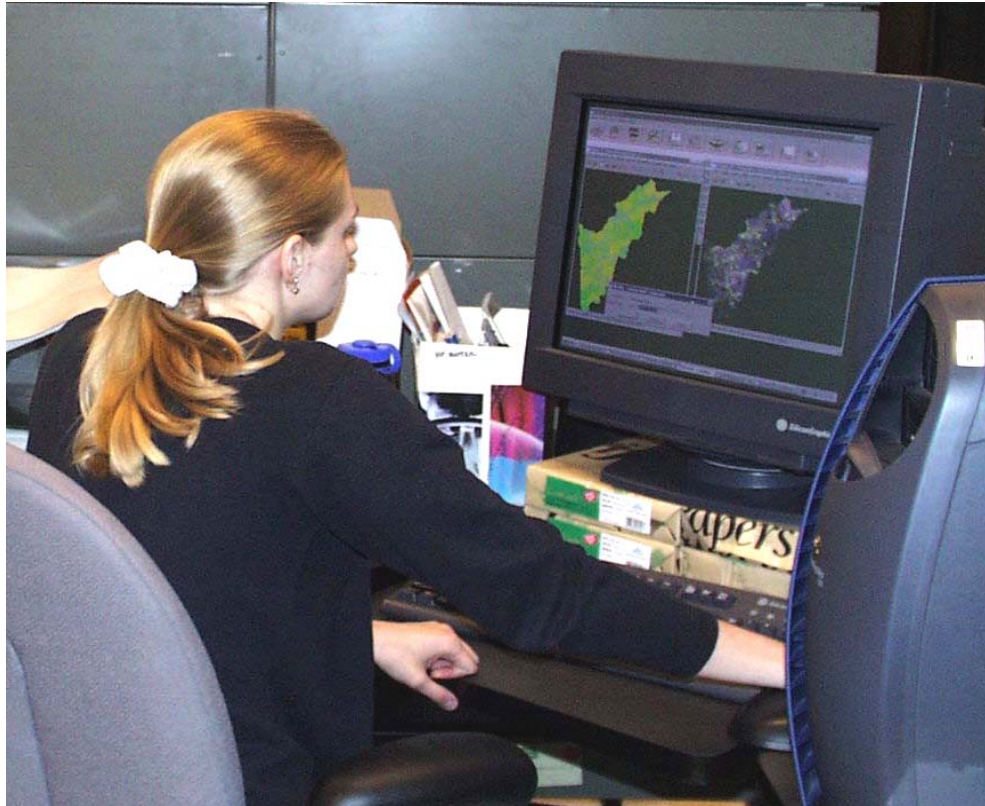


Isotope hydrology methods are used to measure the temperature history of aquifer recharge to help understand global climate change.



Widespread naturally occurring arsenic is present in some geologic environments. Surrogate isotopes are being used to predict where and when elevated arsenic may be found within watersheds.

Geographical Information Systems



Geographic Information Systems (GIS) integrate computer software, hardware, weather reports, maps and other data to help researchers evaluate real-world environmental situations.

Thank you for visiting the NRMRL Virtual Tour



If you have any questions, please call 513-569-7418